

Note

If no oscillograph is available, a complete evaluation of the ignition system is impossible. In such a case, check resistances of the individual ignition circuits with an ohmmeter (ignition distributor – rotor 5 k Ω , suppressor plug – ignition distributor 1 k Ω , suppressor plug – spark plugs 5 k Ω).

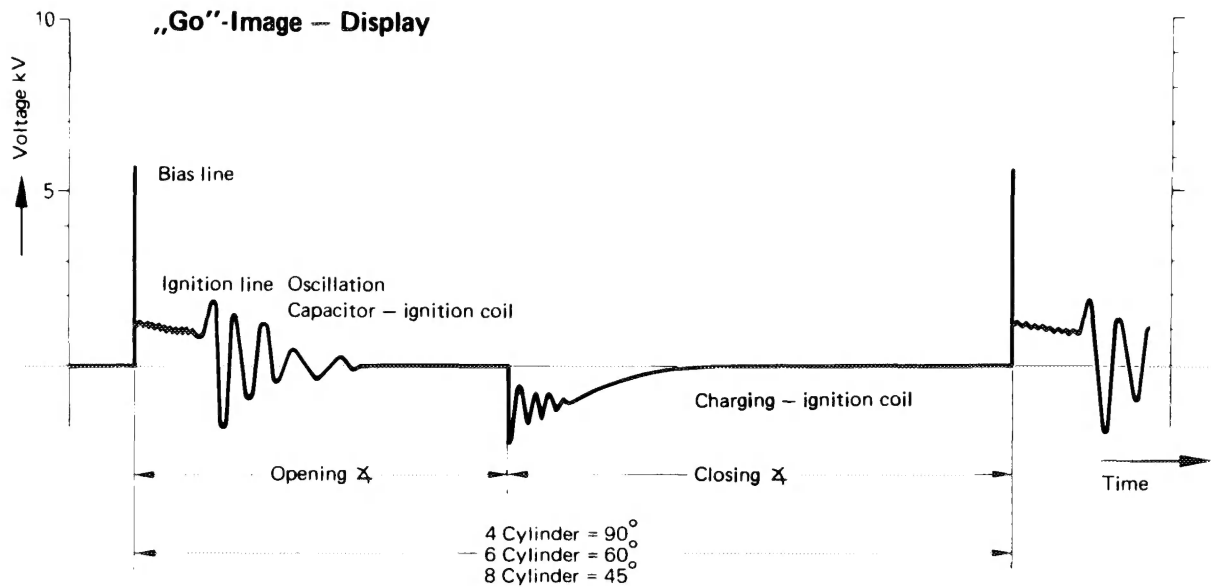


Image selection Display. Image shown expanded in horizontal direction

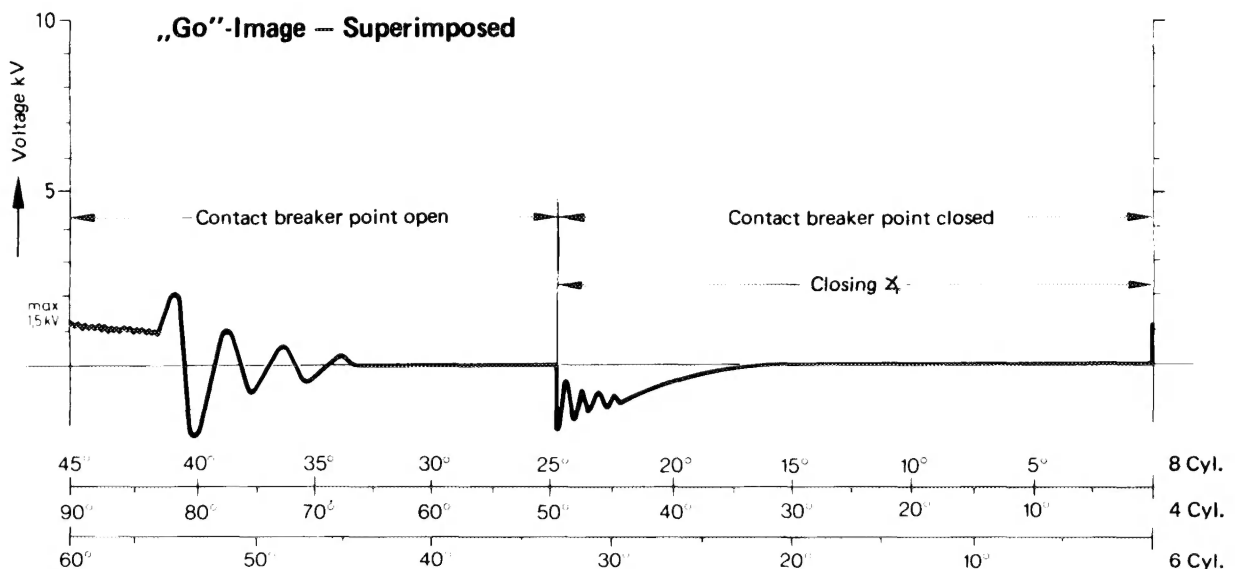


Image selection Superimposed. For this purpose, set begin and end of ignition sequence left and right on calibration line

Z 151-4824



The following oscillograms are showing faults deviating from "Go" image.

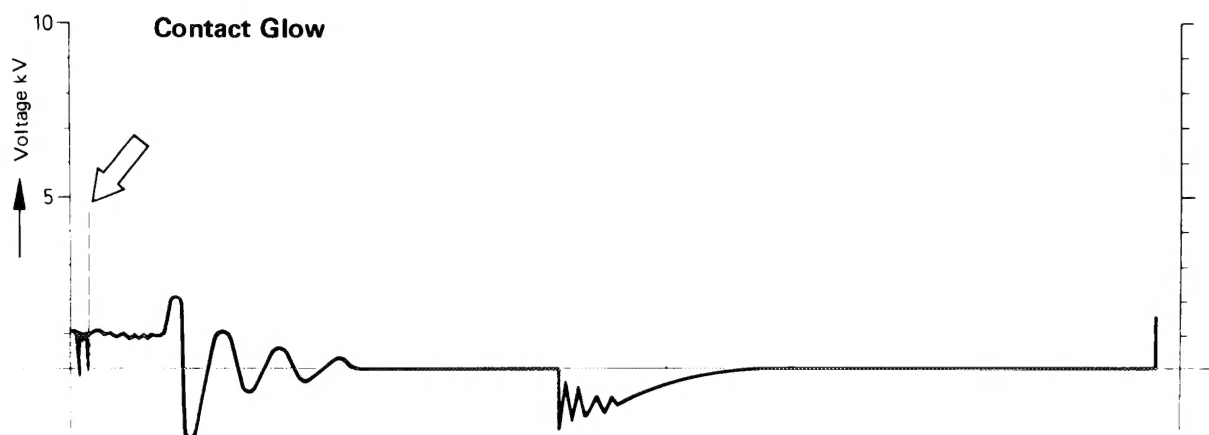


Image selection Superimposed
Image fault Temporary voltage peaks at beginning of ignition line in upward and downward direction
Visible Idling speed
Cause Contact breaker point burned, oiled up, dirty. In very rare cases series resistance in capacitor
Remedy Renew contact breaker point, complete separate capacitor test, if required.

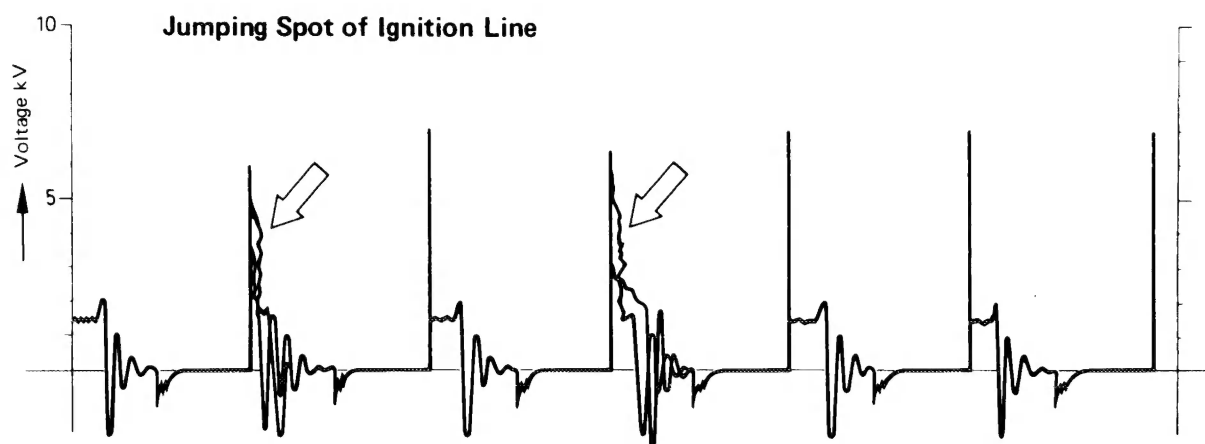


Image selection Display
Image fault Spot of ignition line changes, jumps
Visible May occur at all speeds with or without engine load
Cause Spark plug sooted, oiled-up, lead-coated
Remedy Clean or replace spark plug

Z 151-4825

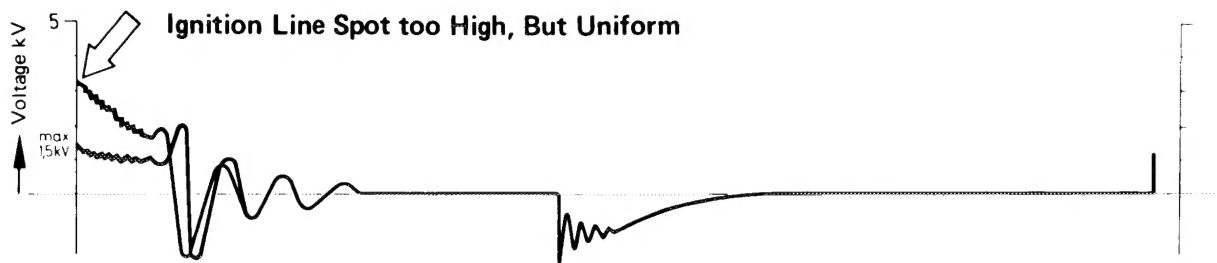


Image selection Superimposed
Visible Idle speed, at one or several cylinders

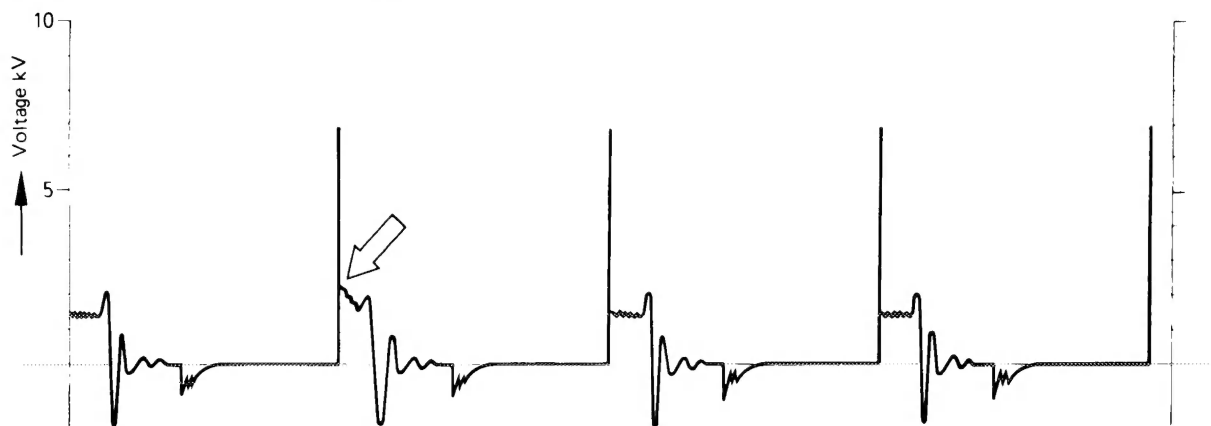


Image selection Display
Image fault Ignition line spot above 1.5 kV
Visible Idle speed at one or several cylinders
Cause Ohmic resistance at secondary end too high, caused by interference suppressor plug on spark plug or ignition distributor disc, ignition cable, distributor disc, spark plug
Remedy Renew parts where ohmic resistance is too high (use ohmmeter)

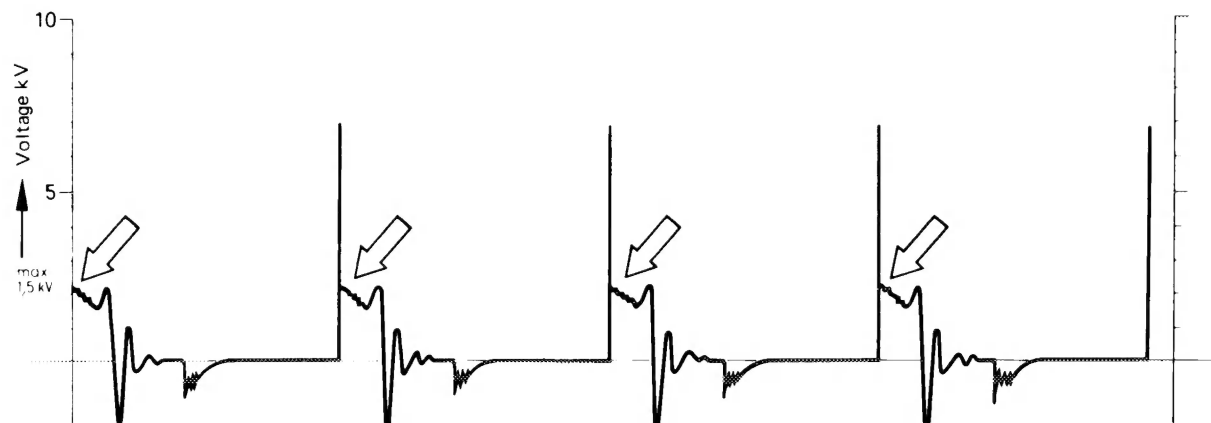


Image selection Display
Image fault Ignition line spots above 1.5 kV
Visible Idle speed at all cylinders
Cause Ohmic resistance at secondary end too high, caused by distributor rotor, distributor disc or high-voltage cable No. 4 with plug
Remedy Renew parts where ohmic resistance is too high (use ohmmeter)

Z 151-4826

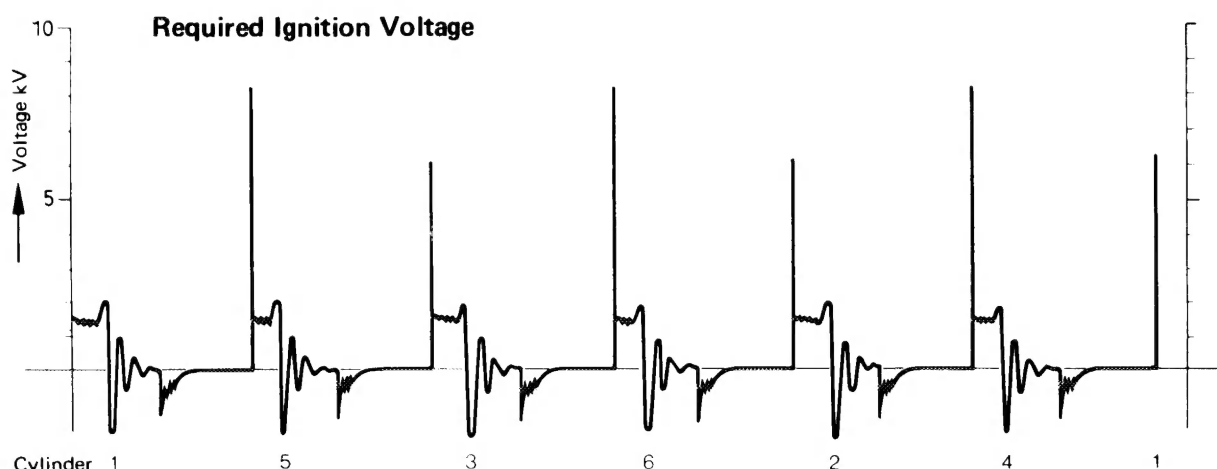


Image selection Display
Image fault Cylinders 4, 5 and 6 require higher ignition voltage than cylinders 1, 2 and 3 (observe firing order)
Visible Idle speed
Cause Uneven mixture distribution in engines with 2-carburetor-systems
Remedy Regulate carburetor (basic adjustment), check intake system for leaks, disassemble and clean carburetor, check diaphragm of full load enrichment and renew, if required.

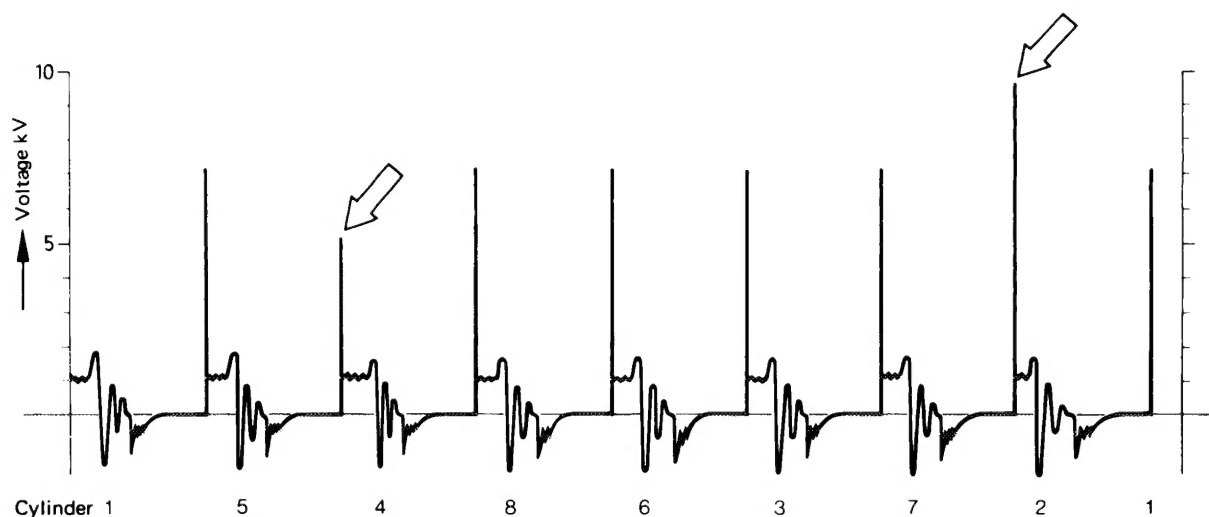


Image selection Display
Image fault Cylinder 4 bias line too low — ignition line longer
 Cylinder 2 bias line too high — ignition line shorter
Visible May occur at all speeds with or without engine load
Cause Cylinder 4 spark plug electrode gap too small, fuel-air mixture too rich, compression losses
 Cylinder 2 spark plug electrode gap too large, fuel-air mixture too lean, additional spark path at secondary end
Remedy Bias line too low: correct spark plug electrode gap, check cylinder for leaks
 Bias line too high: correct spark plug electrode gap, test ignition distributor disc, interference suppressor plug, ignition cable and spark plug for breaks (use ohmmeter)

Z 151-4827

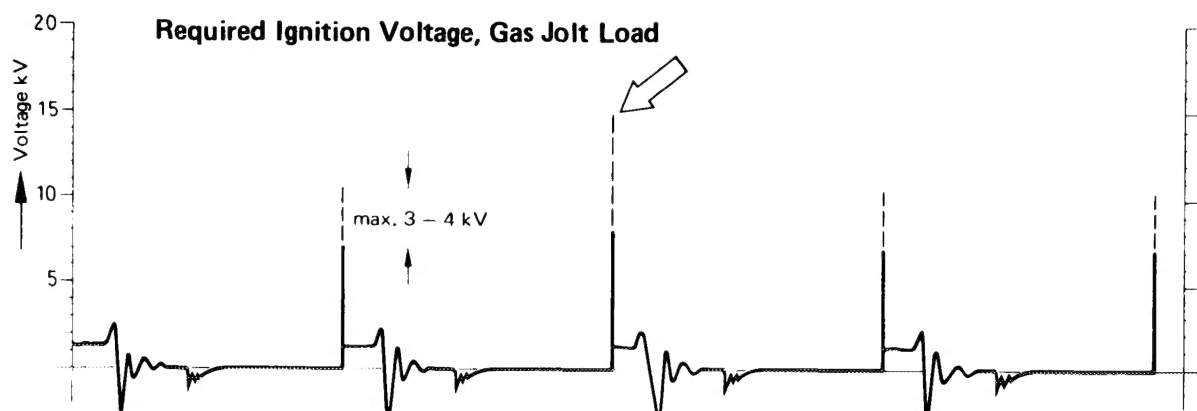


Image selection Display
Image fault Increase of required ignition voltage by more than 4 kV
Visible Accelerate engine repeatedly and suddenly to approx. 3,000/min
Cause Spark plug electrode gap too large
Remedy Correct spark plug electrode gap, replace spark plug, if required.

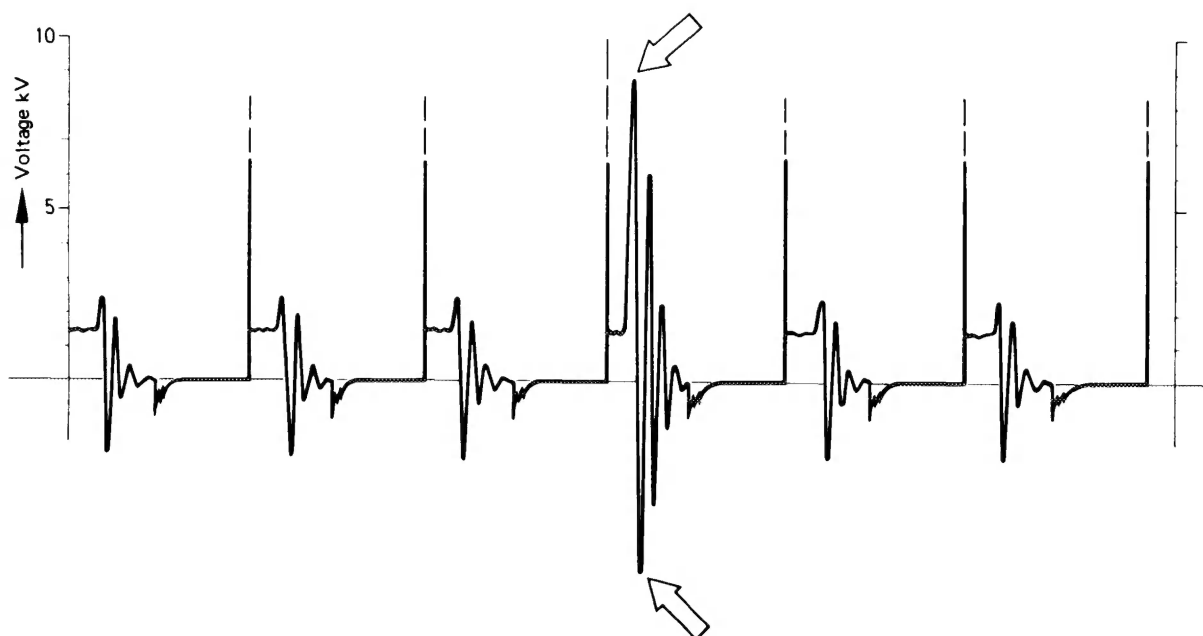


Image selection Display
Image fault Required ignition voltage increases by more than 4 kV, shortened ignition line, heavy increase of oscillations in opening sector above and under zero line
Visible Start engine after extended inoperative period with oscillograph connected, accelerate engine repeatedly and suddenly to approx. 3,000/min
Cause Fuel-air mixture too lean
Remedy Check injection nozzle or injection valve and replace, if required, check pressure valve in injection pump for leaks

Z 151-4828

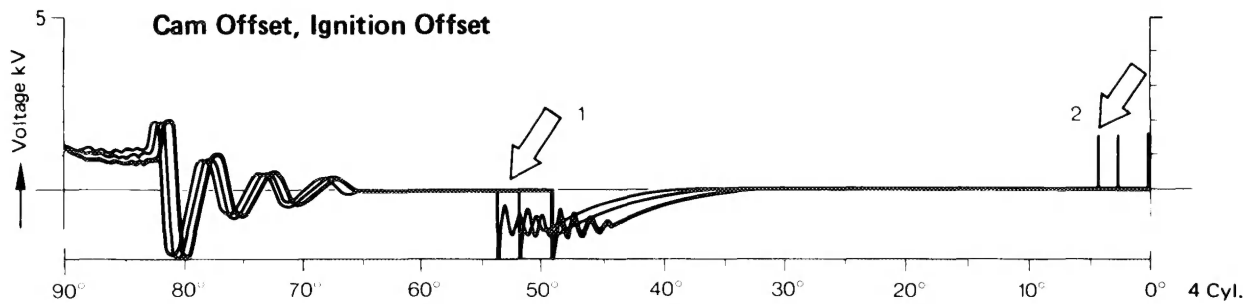


Image selection Superimposed
Image fault Too much cam offset (1) and ignition offset (2), max. 10 % of timing angle
Visible Idle speed
Cause Mechanical fault on ignition distributor or distributor drive, double contact breaker wrongly adjusted
Remedy Adjust double contact breaker, renew ignition distributor, if required.

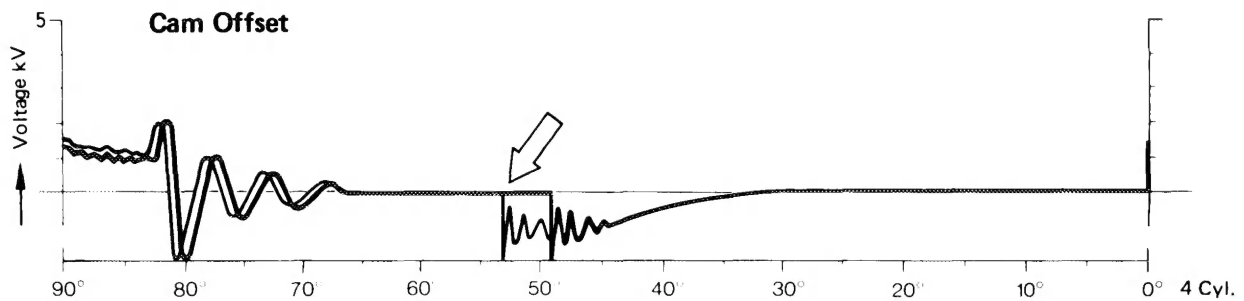


Image selection Superimposed
Image fault Cam offset too high, max. 10 % of timing angle
Visible Idle speed
Cause Descending cam of distributor shaft damaged, ground down, double contact breaker wrongly adjusted
Remedy Adjust double contact breaker, renew ignition distributor, if required

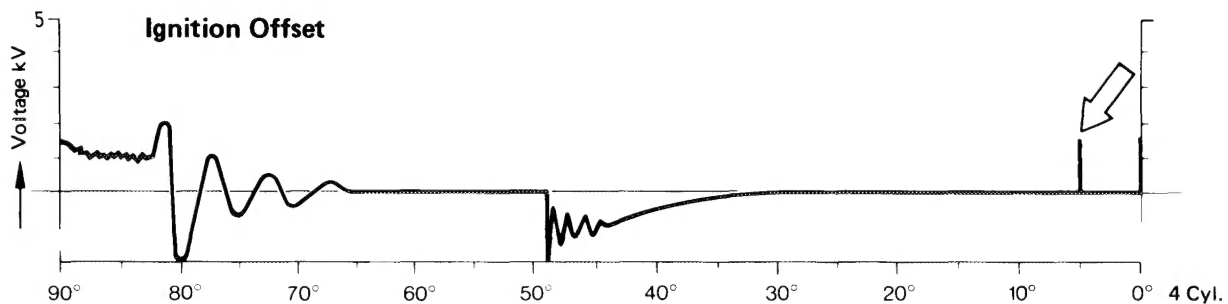


Image selection Superimposed
Image fault Ignition offset too high, max. 10 % of timing angle
Visible Idle speed
Cause Ascending cam of distributor shaft damaged, ground down, double contact breaker wrongly adjusted
Remedy Adjust double contact breaker, renew ignition distributor, if required.

Z 151-4829

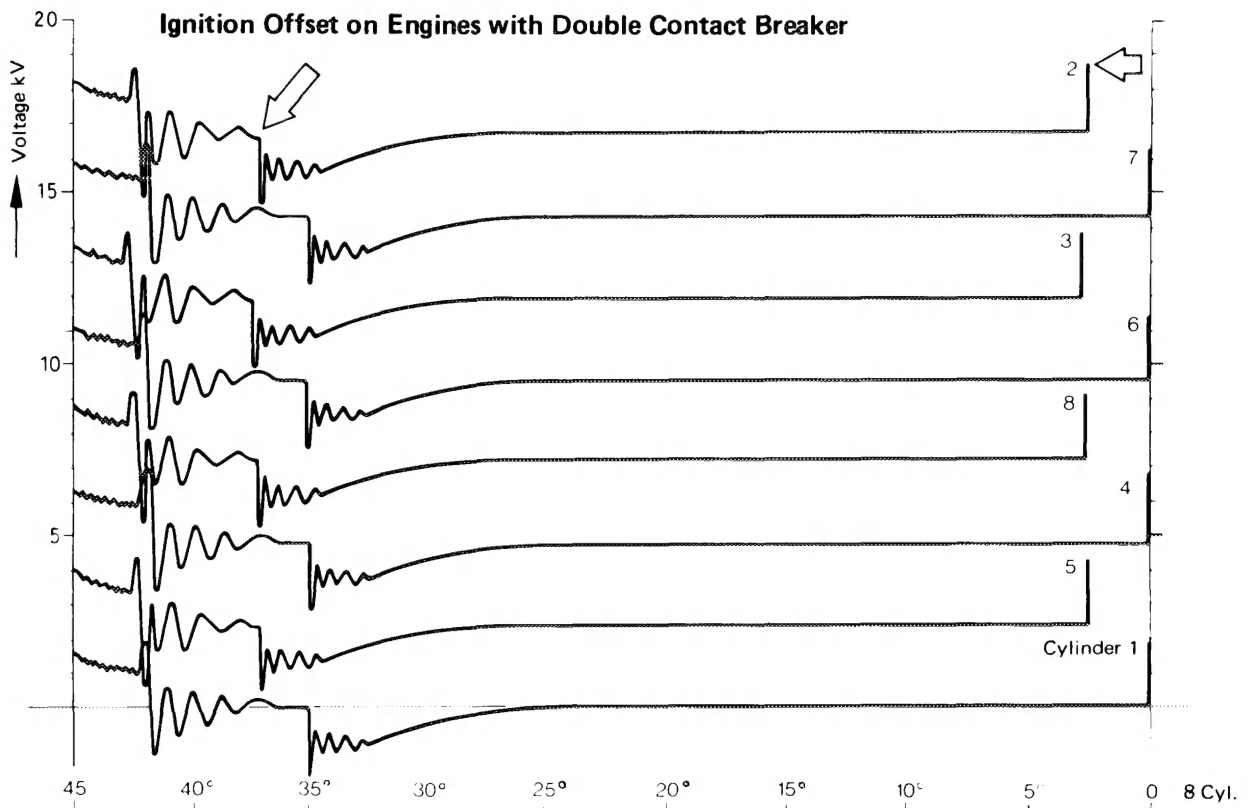


Image selection Grid
Image fault Closing sector of cylinders 5, 8, 3, 2 offset as compared with cylinders 1, 4, 6, 7
Visible Idle speed
Cause Firing point of 5th cylinder (on engine M 189 of 6th cylinder) wrongly adjusted
Remedy Adjust firing point of 5th cylinder (or 6th cylinder) by turning intermediate plate in ignition distributor
Note If timing and ignition offset are of varying size, adjust both timing angle and firing point

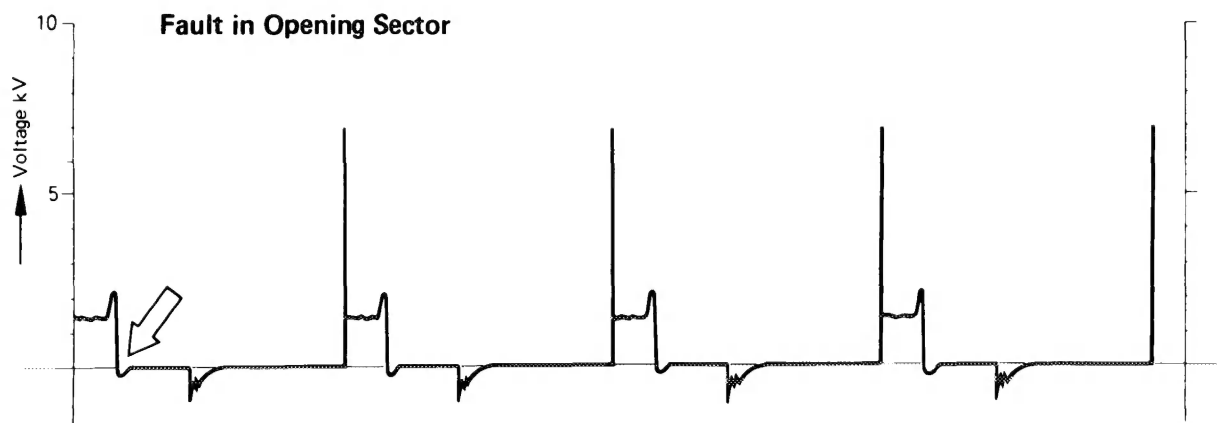


Image selection Display
Image fault No oscillation in opening sector
Visible Idle speed
Cause Defective ignition coil, connection terminal 1 on ignition distributor dirty, in rare cases defective capacitor
Remedy Separate ignition coil and capacitor test, clean ignition distributor (terminal 1 with fiber shim)

Z 151-4830

Ignition Coil – Starting Voltage

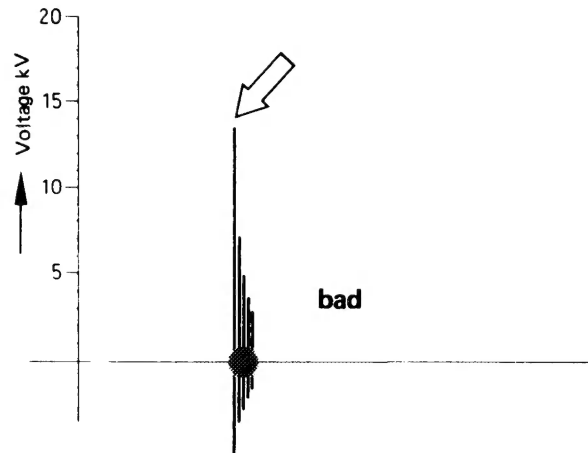
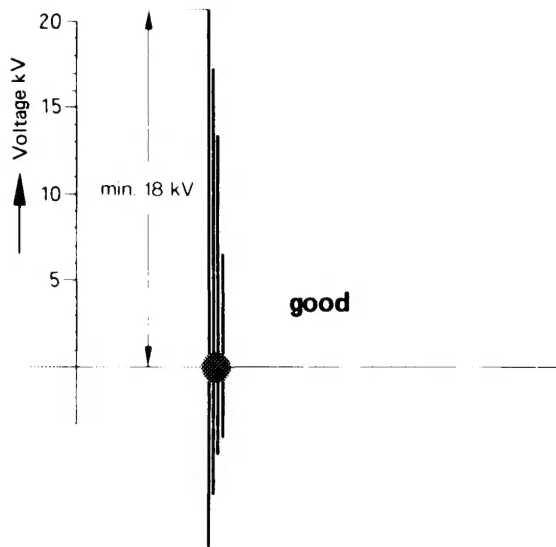


Image selection Display, superimposed
Image fault Starter ignition voltage below 18 kV
Visible Starter speed
Cause Weak battery, resistance in primary circuit, series resistance is not bridged, ignition coil or capacitor defective
Remedy Check battery, charge, check voltage drop battery – ignition coil, complete separate ignition coil and capacitor test
Note Clean high-voltage ignition cable No. 4 on ignition distributor disc

Ignition Coil – Starting Voltage

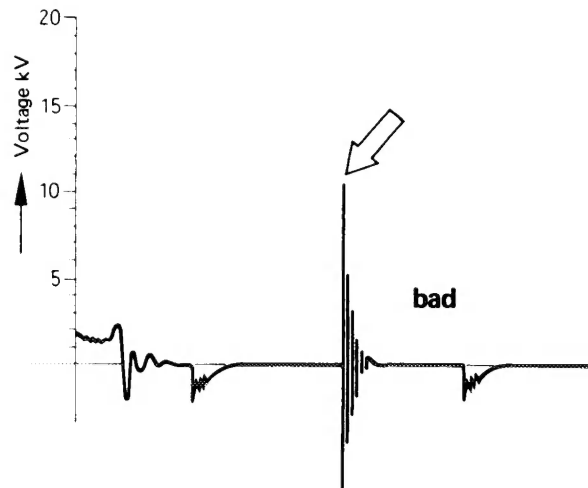
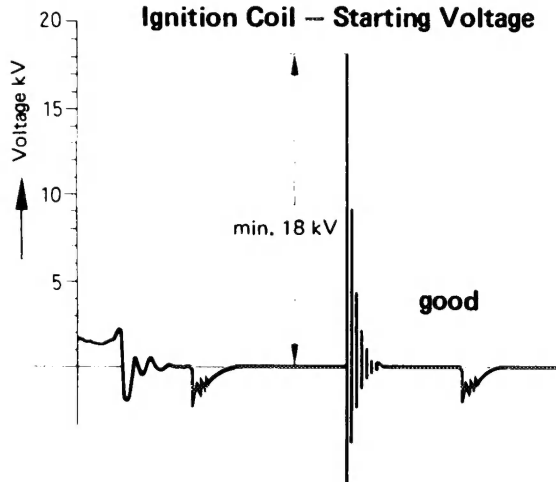


Image selection Display
Image fault Ignition coil reserve voltage under 18 kV
Visible Idle speed, spark plug connector pulled off
Cause Excessive resistance in primary circuit, timing angle too small, ignition coil or capacitor defective
Remedy Check voltage drop battery – ignition coil, complete separate ignition coil and capacitor test

Z 151-4831

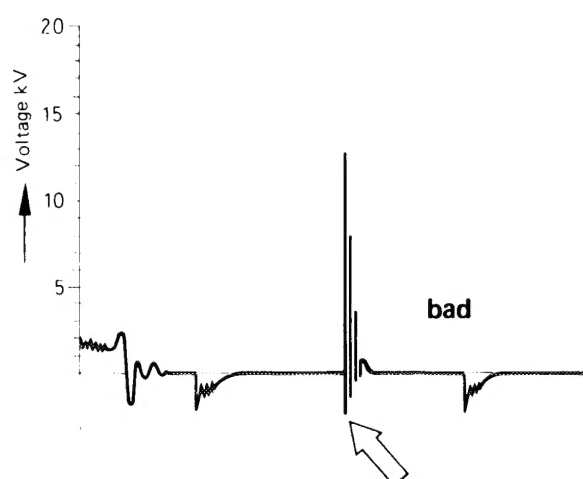
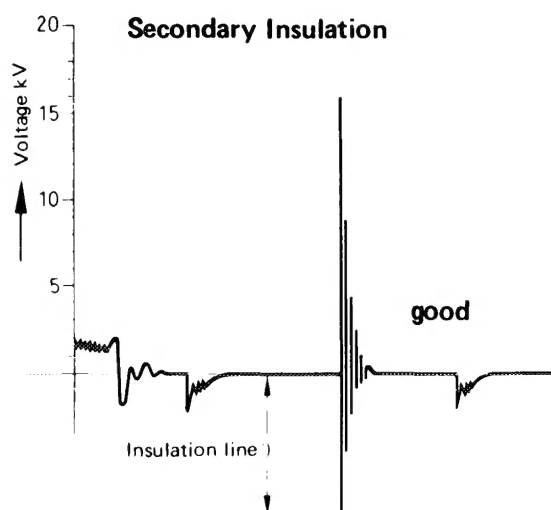


Image selection Display
Image fault Insulation line too short or completely absent
Visible Idle speed, spark plug connector pulled-off
Cause Spark flashover caused by cracks, moisture on ignition coil, ignition cable, ignition distributor disc
Remedy Clean moist and dirty parts, renew torn parts.
 1) Deflection under zero at least 1/3 of ignition coil reserve voltage

Ignition Coil — Separate Test

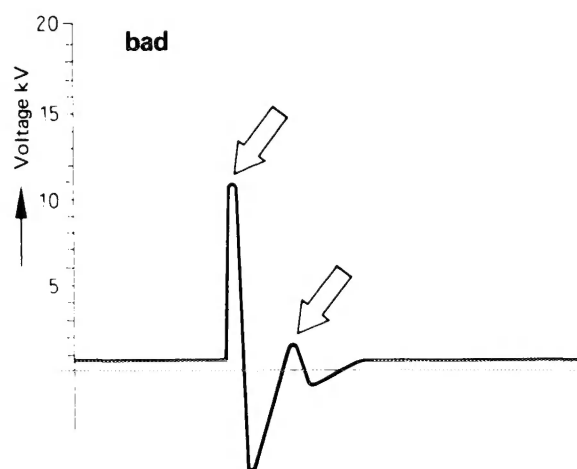
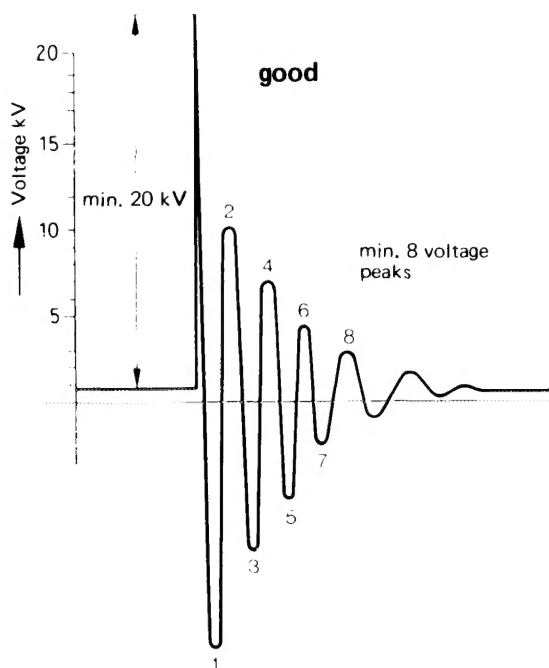


Image selection Display
Image fault Voltage under 20 kV, less than 8 voltage peaks
Cause Broken winding, winding short or insulation damage in relation to grounding contact
Remedy Renew ignition coil

Z 151-4832

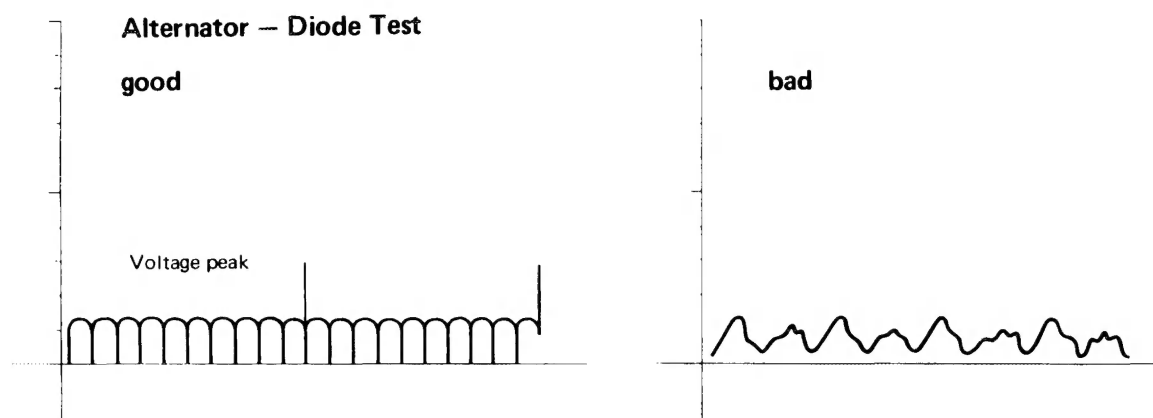


Image selection Display, grid
Image fault Distint irregularity of oscillations
Visible Connect voltmeter to battery, switch oscillograph to "primary" and actutate switch to "alternator test", switch-on low headlight beam, increase engine speed to approx. 3.000/min
Cause Defective diode
Note Voltage peaks caused by ignition system are without significance

Z 151 - 4833